Unit 5: Geometry

In this unit students will become fluent in geometric vocabulary and concepts through hands-on activities involving construction and drawing.

Use all problem types to help students develop understanding of how and to use the operation of multiplication and division. Students need to discuss and compare strategies and models when explaining solutions. Models to use include: interlocking cubes, color tiles, hundreds charts, base 10 blocks, and number lines.

In this unit students will:

• Further develop understandings of geometric figures by focusing on identification and descriptions of plane figures based on geometric properties.

• Identifies examples and non-examples of plane figures and solid figures based on geometric properties.

• Identify differences among quadrilaterals.

• Understand that shapes in different categories may share attributes and those attributes can define a larger category (example: rhombuses, rectangles, and others have four sides and are all called quadrilaterals).

• Expand the ability to see geometry in the real world.

• Can draw plane figure shapes based on attributes.

• Further develop understanding of partitioning shapes into parts with equal areas.

• Partitions shapes in several different ways into equal parts of halves, thirds, fourths, sixths, and eighths and recognizes the partitioned parts have the same area.

• Use data collected to make bar and picture graphs.

• Interpret line plots.

Third Grade students will describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole. Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language.

In second grade, students identify and draw triangles, quadrilaterals, pentagons, and hexagons. Third graders build on this experience and further investigate quadrilaterals (technology may be used during this exploration). Students recognize shapes that are and are not quadrilaterals by examining the properties of the geometric figures. They conceptualize that a quadrilateral must be a closed figure with four straight sides and begin to notice characteristics of the angles and the relationship between opposite sides. Students should be encouraged to provide details and use proper vocabulary when describing the properties of quadrilaterals. They sort geometric figures (see examples below) and identify squares, rectangles, and rhombuses as quadrilaterals.

Students should classify shapes by attributes and by drawing shapes that fit specific categories. For example, parallelograms include: squares, rectangles, rhombi, or other shapes that have two pairs of parallel sides. Also, the broad category, quadrilaterals, includes all types of parallelograms, trapezoids and other four-sided figures.

Students should also use this standard to help build on their understanding of fractions and area. Students are responsible for partitioning shapes into halves, thirds, fourths, sixths and eighths. Given a shape, students partition it into equal parts, recognizing that these parts all have the same area. They identify the fractional name of each part and are able to partition a shape into parts with equal areas in several different ways.

As an ongoing process throughout all third grade units, students should continue to develop understanding of representing and interpreting data using picture and bar graphs. They should also continue their work in generating measurement data by measuring lengths with rulers marked with halves and fourths of an inch. In second grade, students measured length in whole units using both metric and U.S. customary systems. It is important to review with students how to read and use a standard ruler including details about half and quarter marks on the ruler. Students should connect their understanding of fractions to measuring to one-half and one-quarter inch. Third graders need many opportunities measuring the length of various objects in their environment. This standard provides a context for students to work with fractions by measuring objects to a quarter of an inch.

With geometry, many student misconceptions might occur. The four content goals for geometry include shapes and properties, transformation, location, and visualization (see Van de Walle, page 205.) Students often have a difficult time recognizing shapes if the shape has been transformed by a translation, reflection, or rotation. Students may also identify a square as a "non-rectangle" or a "non-rhombus" based on limited images they see. They do not recognize that a square is a rectangle because it has all of the properties of a rectangle. They may list properties of each shape separately, but not see the interrelationships between the shapes. For example, students do not look at the properties of a square that are characteristic of other figures as well. Using straws to make four congruent figures have students change the angles to see the relationships between a rhombus and a square. As students develop definitions for these shapes, relationships between the properties will be understood.

*adapted from Georgia Department of Education